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KIGRE INC TOLEDO OH

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THE DEVELOPMENT OF A HIGH AVERAGE POWER GLASS LASER SOURCE. (U)

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NRL CONTRACT N0001481-C-2376

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LEVEL III

The Development Of A High Average Power Glass Laser Source

Progress Report

August 31, 1981

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Prepared by:

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Kigre, Inc.

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Subject: Progress Report NRL Contract N00014-81-C-2376

Reference: An Unsolicited Proposal for the Development of a High Average Power Glass Laser Source, Dated July 1, 1981

During August, 1981, work ~~on the subject contract~~ was concentrated primarily in the area of selective filtering. We also managed to acquire additional assistance in the form of Dr. C. F. Rapp. Dr. Rapp has been retained as a consultant, ~~in this area.~~ Dr. Rapp's credentials are impeccable; He is the inventor of ED-2 and other silicate and phosphate laser glass. He also has extensive research experience in rare-earth doped glasses, sensitization schemes, and other such areas of quantum electronics and glass science.

As with the previous progress report, we will endeavor to retain the same format dealing with the efforts concerning each of the assigned tasks.

Task 1; Q-100 Property Measurements;

No Activity

Task 2; The Cladding of Q-100;

The following cladding equipment has been ordered.

1. One Model CW-190E-MPX oven.
2. One Model VB-9 vertical hone and coredrill.
3. One redraw tower and furnace assembly.

Dr. C. F. Rapp is conducting a literature search prior to developing a unique cladding glass for Q-100 which is amenable to strengthening. Bids on modification of the cladding room ceiling to accommodate the fifteen foot height of the redraw have been collected.

Task 3; Selective Filtering And/Or Energy Transfer to Reduce Thermal Loading;

A final melt of the base glass using cerium as a dopant confirmed our choice of KF-2. Cerium spectra exhibits a U-V transmission of only up to 400nm thereby

obscuring the 350 and 360nm absorption line of neodymium. In addition, five small melts of Q-100 have been made and rods tested wherein small changes (approximately 1%) in composition appeared to result in changes in the stress-optic parameters. These parameters manifested themselves in a marked change in the character of the laser beam pattern. The changes were recorded as a function of average power pumped into the laser rod. Melt P667 appeared to give us the best and most stable pattern. All Q-100 test rods will be made according to the P667 composition.

Test cavities plus rods and flashlamps are designed and being put into production. We have chosen as a benchmark, a cavity constructed using KF-2 glass. Additional cavities using KSF-5 and KSF-10 will also be constructed for comparison. Measurements continue to determine proper doping ions and concentrations desirable in "pump window" filter.

Task (4) Glass Strengthening and

Literature search

Task (5) Alternate Pump Sources

No activity

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